OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **AYERS POND** the program coordinators recommend the following actions.

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a, also a measure of algal abundance, in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *stable* in-lake chlorophyll-a trend, however, there has been an increase in chlorophyll-a concentrations in the past few years. The results for this season were slightly lower than last year's, which is a good sign, considering the increase in rainfall we experienced this summer. Overall, chlorophyll-a levels are well below the state mean. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. Golden-brown algae dominated Ayers Pond during the summer sampling period. These algae are typically found in most New Hampshire lakes and ponds. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a slightly *worsening* trend in lake transparency since 1996, but water clarity in the pond is still above the NH mean. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is

the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. The graph of the upper water layer shows a *stable* trend for in-lake phosphorus levels, while the graph of the lower water layer shows a *worsening* trend for in-lake phosphorus levels. This means levels are increasing in the hypolimnion; however, the hypolimnetic phosphorus concentrations decreased this season. This is a positive sign and we will continue to monitor the progress in the future. Total phosphorus concentrations have been above the state median for the last four years. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- Conductivity levels in the Inlet were much lower this year than last (Table 6). Conductivity was generally lower this year, most likely as a result of the excess rains, which tend to flush out any pollutants. Conductivity increases often indicate the influence of human activities on surface waters. This decreasing trend is a positive sign. Septic system leachate, agricultural runoff, iron deposits, and road runoff can all influence conductivity.

- Phosphorus levels in the Inlet were again increased this year, although the average was not at the extremely high levels seen in the past (Table 8). We encourage the association to sample the Inlet more diligently to find a possible source of nutrients. Contact the VLAP Coordinator at (603) 271-2658 to schedule a walk of the watershed for the summer of 2001.

- Please note the turbidity values of the hypolimnion were again high this year (Table 11). There are several possible explanations for these high readings. The anchor is either stirring up bottom sediments or the Kemmerer bottle is hitting the bottom during sampling, or the lake is experiencing internal loading. Dissolved oxygen was quite low at the bottom 2 meters (Table 9), which could indicate the release of nutrients from the sediments. However, on particularly windy days the lake mixes and can also cause the bottom sediments to stir. We would like to visit Ayers Pond later in the summer next year, possibly in August, to test the dissolved oxygen. To learn more about internal loading please refer to page 13 of the report.

NOTES

- Monitor's Note (6/28/00): 2 loons and a hawk were seen.

USEFUL RESOURCES

Stormwater Management and Erosion and Sediment Control Handbook. NHDES, Rockingham County Conservation District, USDA Natural Resource Conservation Service, 1992. (603) 772-4385.

A Brief History of Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

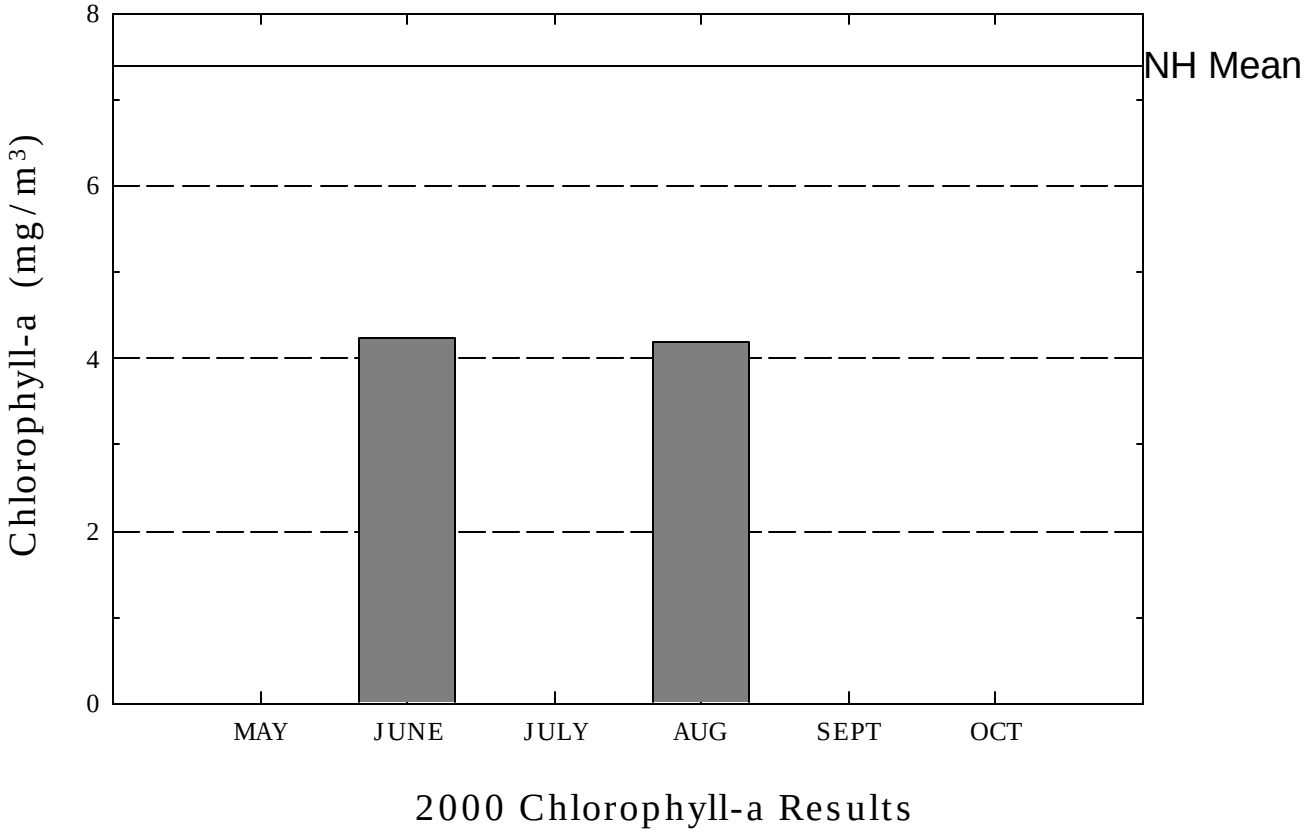
Septic Systems and Your Lake's Water Quality, *WD-BB-11*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Effects of Phosphorus on New Hampshire's Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

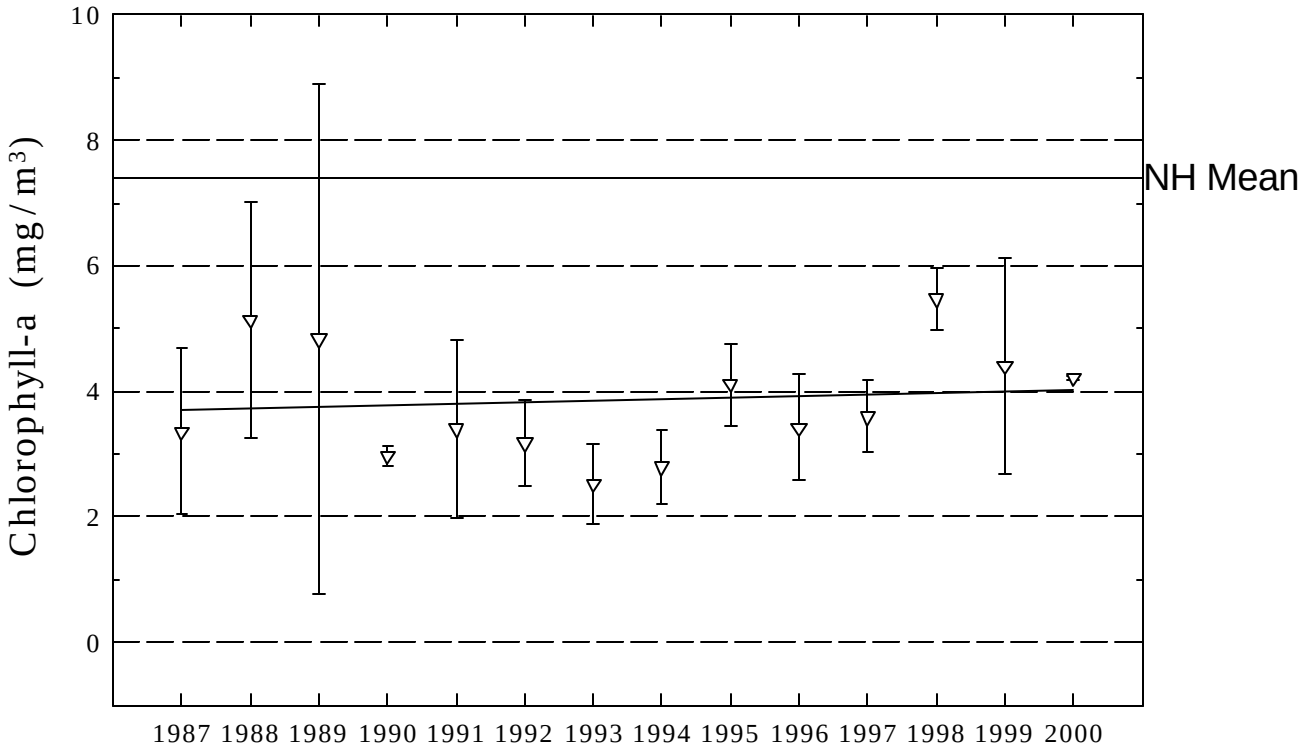
Anthropogenic Phosphorus and New Hampshire Waterbodies, NHDES-WSPCD-95-6, NHDES Booklet, (603) 271-3503

Ayers Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



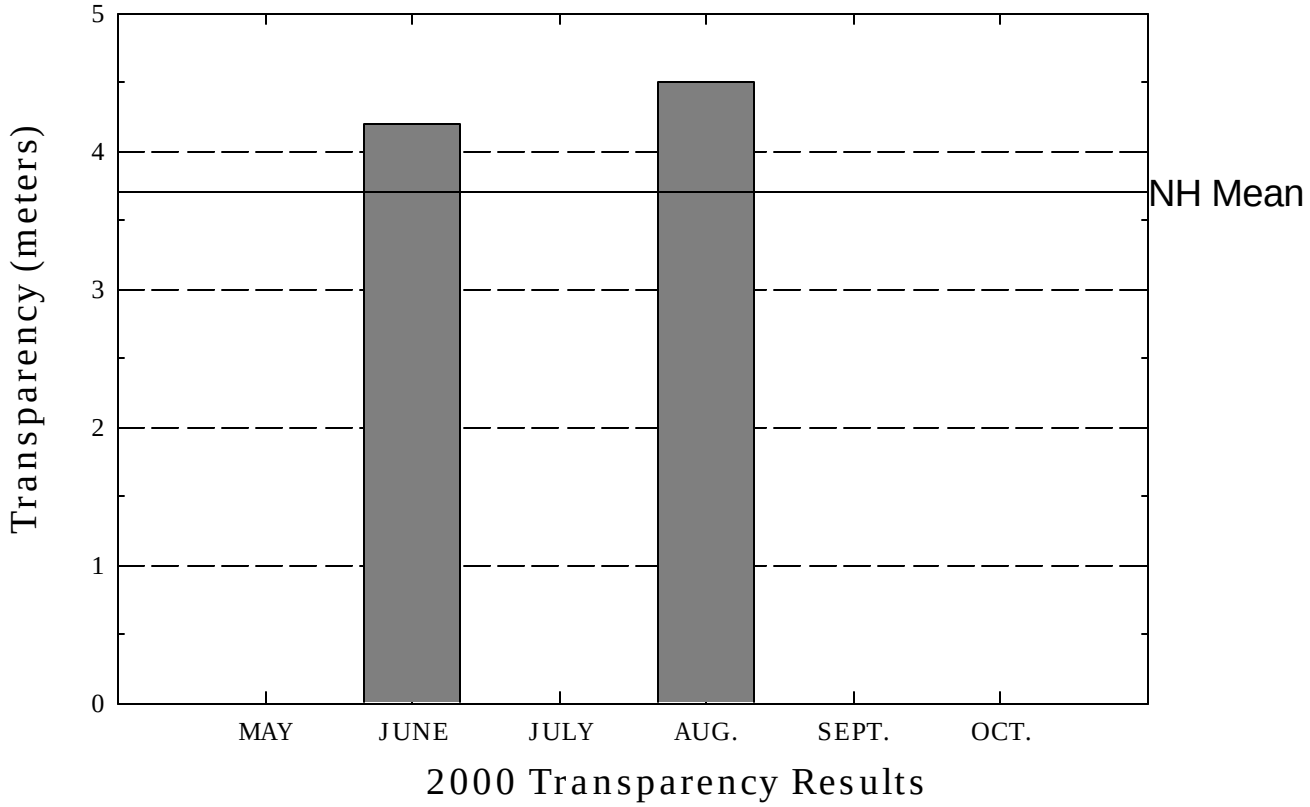
2000 Chlorophyll-a Results

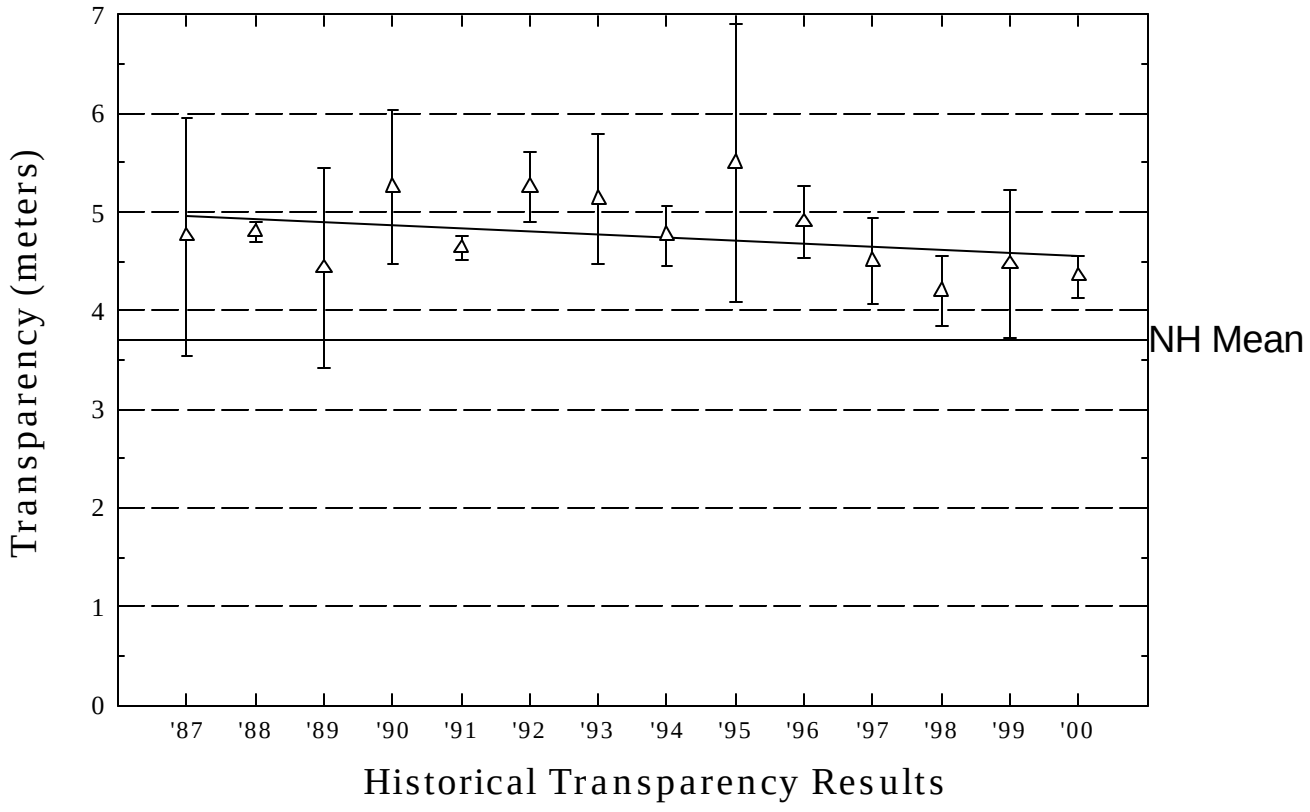


Historical Chlorophyll-a Results

Ayers Pond

Figure 2. Monthly and Historical Transparency Results





Ayers Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

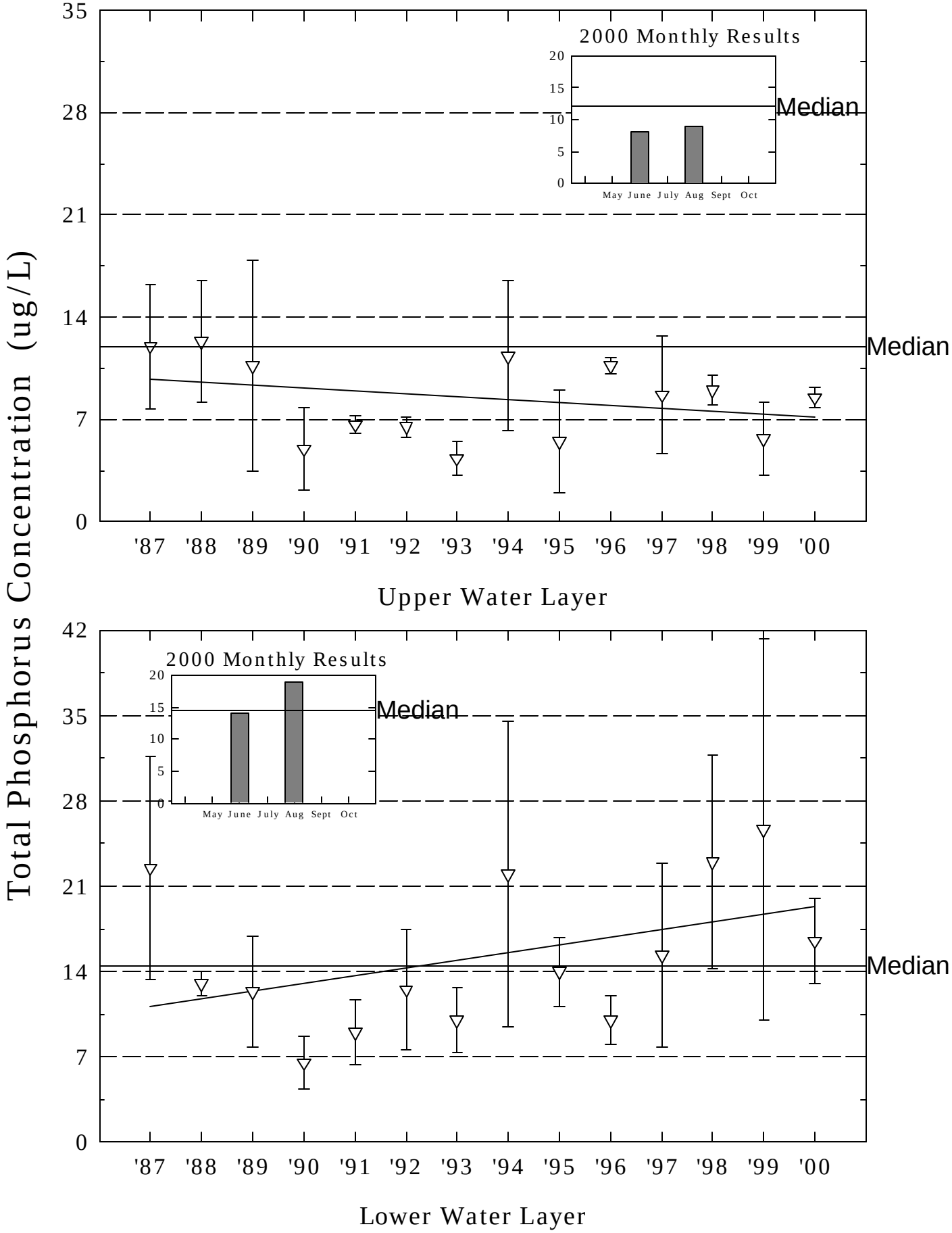


Table 1.

AYERS POND
BARRINGTON

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1987	2.43	4.30	3.36
1988	3.18	6.96	5.13
1989	2.45	9.53	4.84
1990	2.87	3.08	2.97
1991	1.83	4.53	3.40
1992	2.70	3.67	3.18
1993	2.16	3.27	2.53
1994	2.37	3.48	2.80
1995	3.65	4.57	4.01
1996	2.56	4.24	3.42
1997	2.94	4.01	3.59
1998	4.93	5.86	5.47
1999	2.56	5.97	4.40
2000	4.20	4.24	4.22

Table 2.

AYERS POND

BARRINGTON

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
07 / 02 / 1997	TABELLARIA	44
	DINOBRYON	30
	ASTERIONELLA	11
07 / 22 / 1998	MALLOMONAS	91
	UROGLENOPSIS	4
	CERATIUM	4
06 / 29 / 1999	CERATIUM	66
	TABELLARIA	10
	DINOBRYON	7
06 / 28 / 2000	UROGLENOPSIS	31
	MALLOMONAS	26
	SYNURA	23

Table 3.

AYERS POND

BARRINGTON

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1987	3.9	5.6	4.7
1988	4.7	4.9	4.8
1989	3.5	5.5	4.4
1990	4.7	5.8	5.2
1991	4.5	4.7	4.6
1992	5.0	5.5	5.2
1993	4.5	5.8	5.1
1994	4.5	5.1	4.7
1995	4.5	6.5	5.3
1996	4.6	5.3	4.9
1997	4.0	4.8	4.5
1998	3.8	4.4	4.2
1999	3.7	5.2	4.4
2000	4.2	4.5	4.3

Table 4.

AYERS POND

BARRINGTON

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1987	6.62	6.65	6.63
	1988	6.35	6.63	6.45
	1989	6.53	6.91	6.72
	1990	6.58	6.73	6.65
	1991	6.56	6.68	6.64
	1992	6.27	6.54	6.38
	1993	6.56	6.79	6.70
	1994	6.58	6.65	6.62
	1995	6.46	6.50	6.49
	1996	6.13	6.55	6.25
	1997	6.30	6.75	6.52
	1998	6.32	6.58	6.47
	1999	6.36	7.09	6.61
	2000	6.58	6.72	6.64
GOODWIN'S BEACH				
	1989	6.58	6.58	6.58
HYPOLIMNION				
	1987	5.88	5.96	5.92
	1988	6.06	6.32	6.15
	1989	5.95	6.30	6.04
	1990	6.06	6.85	6.30
	1991	6.12	6.45	6.31
	1992	5.89	6.06	5.97
	1993	6.00	6.19	6.12

Table 4.

AYERS POND

BARRINGTON

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
	1994	6.01	6.07	6.04
	1995	6.00	6.09	6.07
	1996	5.72	6.13	5.91
	1997	5.81	6.16	5.97
	1998	6.09	6.10	6.09
	1999	6.14	6.34	6.23
	2000	5.88	6.05	5.96
INLET				
	1987	6.27	6.27	6.27
	1988	6.28	6.28	6.28
	1989	6.11	6.50	6.31
	1990	6.29	6.29	6.29
	1991	6.00	6.00	6.00
	1992	6.12	6.22	6.17
	1993	6.13	6.13	6.13
	1994	6.11	6.40	6.24
	1995	6.43	6.44	6.43
	1996	5.76	6.14	5.97
	1997	6.48	6.66	6.55
	1998	6.12	6.41	6.29
	1999	6.42	6.51	6.46
	2000	6.22	6.31	6.26
LITTLE LONG POND				
	1988	6.26	6.26	6.26

Table 4.

AYERS POND

BARRINGTON

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
METALIMNION				
	1987	6.44	6.51	6.47
	1988	6.38	6.47	6.41
	1989	6.41	6.43	6.42
	1990	6.50	6.69	6.58
	1991	6.47	6.56	6.51
	1992	6.23	6.43	6.32
	1993	6.47	6.65	6.53
	1994	6.27	6.61	6.45
	1995	6.24	6.52	6.36
	1996	5.80	6.17	5.96
	1997	6.05	6.53	6.29
	1998	5.81	6.10	5.97
	1999	6.18	6.48	6.26
	2000	6.35	6.42	6.38
OUTLET				
	1987	6.45	6.60	6.52
	1988	6.16	6.53	6.34
	1989	6.32	6.75	6.54
	1990	6.30	6.44	6.36
	1991	6.10	6.70	6.30
	1992	6.49	6.60	6.54
	1993	6.48	6.59	6.55
	1994	6.39	6.70	6.54
	1995	6.24	6.44	6.33
	1996	5.92	6.14	6.02

Table 4.

AYERS POND

BARRINGTON

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
	1997	6.40	6.54	6.46
	1998	6.21	6.38	6.30
	1999	6.26	6.58	6.37
	2000	6.32	6.35	6.33

Table 5.

AYERS POND

BARRINGTON

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1987	2.50	2.50	2.50
1988	2.20	4.30	2.93
1989	2.50	2.60	2.53
1990	2.80	3.70	3.25
1991	2.70	2.80	2.73
1992	3.00	3.00	3.00
1993	2.50	2.80	2.60
1994	2.10	2.80	2.50
1995	2.70	3.10	2.90
1996	2.10	2.70	2.50
1997	2.50	4.01	3.04
1998	2.50	2.60	2.57
1999	1.60	3.30	2.70
2000	2.30	2.60	2.45

Table 6.

AYERS POND
BARRINGTON

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1987	42.6	44.8	43.7
	1988	42.5	44.4	43.6
	1989	44.9	45.6	45.1
	1990	48.2	49.1	48.6
	1991	46.3	48.5	47.4
	1992	47.4	47.7	47.5
	1993	50.3	51.5	51.1
	1994	54.0	56.0	55.0
	1995	57.3	58.5	57.9
	1996	59.9	60.8	60.4
	1997	54.7	55.8	55.0
	1998	52.1	55.4	53.5
	1999	63.3	63.6	63.5
	2000	65.7	66.1	65.9
GOODWIN'S BEACH				
	1989	46.5	46.5	46.5
HYPOLIMNION				
	1987	42.9	46.7	44.8
	1988	43.4	45.5	44.3
	1989	45.5	47.9	46.7
	1990	47.3	47.8	47.5
	1991	48.1	48.5	48.3
	1992	48.1	49.8	48.9
	1993	49.5	50.8	50.1

Table 6.

AYERS POND
BARRINGTON

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
	1994	51.7	56.3	54.4
	1995	56.1	57.3	56.9
	1996	59.1	62.2	60.4
	1997	55.8	58.5	57.0
	1998	64.2	71.7	67.8
	1999	62.9	69.1	65.0
	2000	69.9	69.9	69.9
INLET				
	1987	74.9	74.9	74.9
	1988	85.5	85.5	85.5
	1989	67.1	76.5	72.6
	1990	76.8	76.8	76.8
	1991	63.4	63.4	63.4
	1992	74.3	88.2	81.2
	1993	142.5	142.5	142.5
	1994	100.7	118.3	107.4
	1995	98.0	99.6	98.8
	1996	76.9	91.1	85.0
	1997	91.3	112.6	105.4
	1998	50.7	66.0	60.8
	1999	113.4	116.4	114.9
	2000	73.9	83.1	78.5
LITTLE LONG POND				
	1988	62.7	62.7	62.7

Table 6.

AYERS POND
BARRINGTON

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
METALIMNION				
	1987	42.4	44.9	43.6
	1988	42.6	44.0	43.3
	1989	44.9	45.0	44.9
	1990	46.5	48.5	47.5
	1991	47.1	49.0	48.0
	1992	47.6	47.7	47.6
	1993	49.5	51.3	50.2
	1994	53.4	56.1	54.9
	1995	55.2	57.6	56.4
	1996	59.8	61.3	60.6
	1997	54.3	55.7	55.1
	1998	54.9	56.3	55.4
	1999	62.2	63.8	63.1
	2000	65.7	66.2	66.0
OUTLET				
	1987	43.7	45.9	44.8
	1988	41.6	43.7	42.6
	1989	43.8	44.7	44.3
	1990	48.5	48.5	48.5
	1991	46.6	48.4	47.5
	1992	47.1	47.8	47.4
	1993	49.4	52.2	51.1
	1994	52.3	56.1	54.2
	1995	55.4	56.5	55.9
	1996	58.7	62.1	60.3

Table 6.

AYERS POND
BARRINGTON

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
	1997	54.0	57.3	55.3
	1998	51.1	54.5	53.4
	1999	62.9	64.2	63.6
	2000	65.3	65.8	65.6

Table 8.

AYERS POND

BARRINGTON

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1987	9	15	12
	1988	9	17	12
	1989	6	19	10
	1990	3	7	5
	1991	6	7	6
	1992	6	7	6
	1993	3	5	4
	1994	7	17	11
	1995	3	11	7
	1996	10	11	10
	1997	4	11	8
	1998	8	10	9
	1999	3	8	5
	2000	8	9	8
GOODWIN'S BEACH				
	1989	8	8	8
HYPOLIMNION				
	1987	16	29	22
	1988	12	14	13
	1989	8	17	11
	1990	5	8	6
	1991	7	12	9
	1992	9	16	12
	1993	7	12	10

Table 8.

AYERS POND

BARRINGTON

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
	1994	12	36	22
	1995	12	16	14
	1996	8	12	10
	1997	8	23	15
	1998	17	33	23
	1999	9	40	25
	2000	14	19	16
INLET				
	1987	43	43	43
	1988	30	30	30
	1989	24	43	31
	1990	13	13	13
	1991	23	23	23
	1992	15	18	16
	1993	8	8	8
	1994	23	46	34
	1995	19	22	20
	1996	19	47	29
	1997	13	26	18
	1998	18	22	20
	1999	10	14	12
	2000	15	21	18
LITTLE LONG POND				
	1988	24	24	24

Table 8.

AYERS POND

BARRINGTON

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
METALIMNION				
	1987	12	16	14
	1988	6	12	9
	1989	6	7	6
	1990	4	10	7
	1991	7	8	7
	1992	9	9	9
	1993	4	8	6
	1994	10	16	13
	1995	6	11	8
	1996	9	12	10
	1997	7	16	11
	1998	10	14	12
	1999	4	7	5
	2000	9	11	10
OUTLET				
	1987	9	9	9
	1988	10	17	12
	1989	5	24	12
	1990	13	17	15
	1991	8	11	9
	1992	6	8	7
	1993	9	11	10
	1994	11	19	15
	1995	7	10	8
	1996	11	27	18

Table 8.

AYERS POND

BARRINGTON

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
	1997	3	15	10
	1998	8	17	12
	1999	7	12	9
	2000	10	12	11

Table 9.

AYERS POND

BARRINGTON

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
		June 28, 2000	
0.1	24.8	7.2	86.9
1.0	24.6	7.2	86.3
2.0	24.5	7.2	86.7
3.0	24.2	7.1	84.9
4.0	21.8	7.5	85.2
5.0	17.5	7.9	82.3
6.0	13.9	4.3	42.0
7.0	11.5	1.5	14.0
8.0	11.0	0.3	2.9

Table 10.

AYERS POND

BARRINGTON

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
July 16, 1987	9.0	9.5	0.8	7.0
June 27, 1988	8.0	10.0	0.6	5.0
July 19, 1989	8.5	11.0	0.3	3.0
June 27, 1990	9.0	10.0	0.1	0.9
June 24, 1991	8.0	10.0	0.5	4.4
July 1, 1992	8.5	8.7	0.0	0.0
July 19, 1993	8.0	11.5	1.0	9.0
June 17, 1994	8.0	11.7	0.5	4.0
June 26, 1995	8.0	10.8	0.9	8.0
August 29, 1995	8.5	14.0	1.3	13.0
July 2, 1996	8.0	12.0	0.6	5.0
July 2, 1997	9.0	11.6	0.1	1.0
July 22, 1998	8.0	12.2	0.2	2.0
June 29, 1999	8.0	12.3	6.1	56.6
June 28, 2000	8.0	11.0	0.3	2.9

Table 11.

AYERS POND
BARRINGTON

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1997	0.3	0.4	0.3
	1998	0.3	0.7	0.4
	1999	0.3	0.5	0.4
	2000	0.3	0.4	0.3
HYPOLIMNION				
	1997	0.7	1.6	1.2
	1998	1.4	6.3	3.7
	1999	0.6	4.7	2.2
	2000	2.5	4.4	3.4
INLET				
	1997	0.3	0.5	0.4
	1998	0.2	0.4	0.3
	1999	0.2	0.2	0.2
	2000	0.2	0.4	0.3
METALIMNION				
	1997	0.3	0.4	0.4
	1998	0.5	0.7	0.6
	1999	0.4	0.7	0.5
	2000	0.3	0.4	0.4
OUTLET				
	1997	0.3	0.6	0.4
	1998	0.4	0.6	0.5
	1999	0.5	0.7	0.5
	2000	0.6	0.6	0.6